relations of the University with its own colleges and students are unsatisfactory, and it is most desirable that a Royal Commission should be issued to inquire into the working of this University as an examining and teaching body in relation to the educational needs of the country at large, and to report as to the means by which University education in Ireland might receive a greater extension and be more efficiently conducted than it is at present."

AN influential committee, headed by the Duke of Devonshire, the Duke of Argyll, the Earl of Derby and Earl Spencer, have issued an appeal with the object of raising 150,000*l.* in celebration of the jubilee of Owens College, Manchester. Fifty thousand pounds are needed to discharge debts that have been contracted and 100,000*l.* for additional endowment. Among the objects the promoters have in view are the extinction of the debt of 22,000*l.* on the buildings of the medical school; special endowments for existing chairs, including chemistry, education, anatomy and philosophy; the establishment of an institution for bacteriological investigation and for the study of hygiene, and of research Fellowships; and the creation of a pension fund for members of the teaching staff.

SCIENTIFIC SERIALS.

American Journal of Mathematics, vol. xxiii. No. 1, January.—The new volume opens with a memoir by S. Kantor, entitled "Die Typen der linearen Complexe rationaler curven im R_n."—E. J. Wilczynski writes on transformation of systems of linear differential equations. It has been shown by Staeckel (*Crelle*, band 111) that the most general transformation, which converts a general homogeneous linear differential equation of order $m > 1$ into another of the same form and order, is

$$T : x = f(\xi),\ y = \phi(\xi)\eta,$$

where $f(\xi)$ and $\phi(\xi)$ are arbitrary functions of ξ. If $m = 1$ the most general transformation is

$$x = f(\xi),\ y = \phi(\xi)\eta^{\lambda}\ (\lambda \text{ a constant}).$$

The present paper considers a *system* of linear differential equations, and finds the most general transformation which converts such a system into a system of the same order. The transformation thus formed contains T as a special case. Staeckel's method is adopted in essence. The author is working at a theory of invariants of such systems, based on this general transformation.—Distribution of the ternary linear homogeneous substitutions in a Galois field into complete sets of conjugate substitutions, by L. E. Dickson, and the following paper, "Distribution of the quaternary linear homogeneous substitutions in a Galois field into complete sets of conjugate substitutions," by T. M. Putnam, are in continuation of a memoir by the former writer in vol. xxii. (pp. 121–137).—On the determination and solution of the metacyclic quintic equations with rational coefficients, by J. C. Glashan, is a tardy fulfilment of a promise made in vol. vi. p. 114.—E. O. Lovett contributes a construction of the geometry of Euclidean n-dimensional space by the theory of continuous groups.—A table of class numbers for cubic fields, by Legh W. Reid, is calculated with a view to furnishing for the general algebraic number fields an amount of number material sufficiently great to be of use in the further study of these fields, and in particular in that of the cubic fields. It gives for each of 161 cubic number fields the class number, h, the discriminant Δ, a basis, and the factorisation of certain rational primes into their prime ideal factors. The method is founded upon a theorem of Minkowski's. In every ideal class there is an ideal, j, whose norm, $n(\mathrm{j})$, satisfies the condition

$$n(\mathrm{j}) < \left(\frac{4}{\pi}\right)^{r} \frac{m\,!}{m^{m}} \left| \sqrt{\Delta} \right|,$$

where m is the degree and Δ the discriminant of the field, and r the number of pairs of imaginary fields found among the m conjugate fields, $k^{(1)}, k^{(2)}, \ldots k^{(m)}$. The writer refers to Hilbert, "Bericht über die Theorie der Algebraischen Zahlkörper"; Minkowski, "Geometrie der Zahlen," and Woronoj, "The algebraic integers, which are functions of a root of an equation of the third degree" (translation of Russian title). The tables take up ten pages.—On certain properties of the plane cubic curve in relation to the circular points at infinity, by R. A. Roberts, contains an investigation of some methods of generating a plane cubic curve.—With this opening number is presented an excellent portrait of Dr. George Salmon, and a supplement gives a still more excellent one of Prof. Mittag Leffler.—Prof. Frank Morley is the editor in chief.

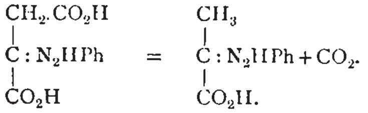
Bulletin of the American Mathematical Society, January.—Prof. Lovett gives an account of the proceedings at the International Congress of Philosophy, which was held at Paris on August 1–5, 1900, and furnishes *résumés* of the papers read and the discussions occasioned by them, so far as they bore, more or less directly, upon mathematical questions. The sketch is founded upon the account printed in the September (1900) number of the *Revue de Métaphysique et de Morale*. It occupies pp. 157–183.—A demonstration of the impossibility of a triply asymptotic system of surfaces, by Dr. Eisenhart, was read before the Society on December 28, 1900. It is a notelet founded upon Bianchi's Lezioni.—Prof. E. W. Brown writes short notices of Berry's "Short History of Astronomy" and of H. Suter's "Die Mathematiker und Astronomen der Araber und ihre Werke." This latter, though only a catalogue of over five hundred names of mathematicians and astronomers, and so at first sight not giving promise of much interest, is really, as Prof. Brown shows, a work of considerable interest. He illustrates this statement by a few extracts.—There are a fair amount of notes and new publications.

SOCIETIES AND ACADEMIES.

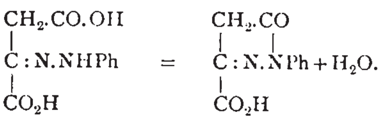
LONDON.

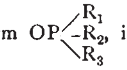
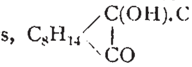
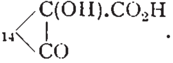
Physical Society, February 22.—Prof. S. P. Thompson, president, in the chair.—A paper on how air subjected to X-rays loses its discharging property, and how it discharges electricity, by Prof. Emilio Villari (Hon. Fellow), was read by the chairman. Air made active by X-rays in passing through a long tube coiled in many turns loses much more of its discharging power than it does in passing through the same tube if straight. During this process the tube charges itself to a certain potential. If active air is allowed to stream on masses of wire gauze or wound up ribbons, enclosed in tubes, the metals, independent of their nature, take a positive or negative charge according to whether the active air rubs against them with force or lightly. Experiments have been performed to prove this. For instance, tubes of copper or lead, if short and straight, take negative charges, but if long and coiled they take positive charges. These phenomena cannot be attributed to chemical actions, but seem to be produced by a special rubbing of the active air upon metallic surfaces, as the result of which they assume one of the charges, and the other charge ought to manifest itself in the air. This is not the case, the charge of the air being often of the same kind as that of the metals. It has previously been shown by the author that active air by streaming against an electrified body is reduced either to ordinary air or to air charged with the electricity which disappears. Hence it may be supposed that the active air in rubbing upon the metallic surfaces develops the two electricities, one of which manifests itself upon these surfaces, and the other goes to reduce the active air to ordinary air, and therefore does not become manifest. The electroscope used in the experiments consisted of a fixed brass plate and a gold leaf whose position was determined by means of a telescope with an eye-piece scale.—The chairman said he had observed the fact that metals were charged sometimes positively and sometimes negatively by active air. Mr. Watson asked if any experiments had been performed on the viscosity of gases rendered active by X-rays.—A paper on the propagation of cusped waves and their relation to the primary and secondary focal lines, by Prof. R. W. Wood, was read by Mr. Watson. This paper is a discussion of the reflexion of a plane wave by a hemispherical mirror, the reflected wave being likened to a volcanic cone. The cusp of the wave, or the rim of the crater, traces the caustic and is continuously passing through a focus. This accounts for the increased illumination along the caustic. The wave fronts were drawn by constructing the orthogonal surface, which in section is an epicycloid. The evolute of this curve is the caustic, and the reflected wave fronts form a family of parallel curves which are the involutes of the caustic. The wave front between two focal lines is expanding along one meridian and contracting along a meridian at right angles to it; in other words, the wave is convex along one meridian and concave along the other. The outer slope of the volcanic cone representing the reflected wave corresponds to the portion of the wave front between the focal lines. A useful piece of apparatus can be made by silvering the outside of a hemispherical glass vessel. The concave mirror thus formed should be mounted on a stand, and a small electric lamp arranged so that it can move along the axis of the mirror. A spherical wave starting at the focus of a hemispherical mirror is reflected as a saucer-shaped wave, the curved sides of the saucer coming to a focus in a ring surrounding the nearly flat circular bottom. If the lamp is placed at the focus the luminous ring and the uniformly illuminated area within it can be shown on a ground glass screen. If the lamp be moved to a point midway between the focus and the mirror, a ring of intense brilliance, with very little light within it, is formed.—A paper on cyanine prisms, by Prof. R. W. Wood, was read by Mr. Watson. Prof. Wood has already described a method of making prisms of solid cyanine by pressing the fused dye between plates of glass. Until recently, angles of about half a degree were the largest that could be used with advantage on account of the small quantity of green light transmitted. A new supply of the dye has been found to transmit a large quantity of green light with an angle of over one degree. By viewing the filament of an incandescent electric lamp through one of these prisms the anomalous spectrum is seen, the colours being arranged in the order green, blue, violet, red, orange. Prof. Wood has crossed one of these prisms with a photographic copy of a diffraction grating having 2000 lines to the inch. On viewing a naked arc lamp the diffraction spectra are deviated by the prism, the red ends being turned up and the blue-green ends turned down.—The chairman said he had been trying to obtain some cyanine, but had not succeeded. Rosaniline has an anomalous dispersion, but cannot be fused. The acetate of rosaniline might, however, be used. The Society then adjourned until March 8.

Chemical Society, February 7.—Prof. Thorpe, president, in the chair.—The action of hydrogen bromide on carbohydrates, by H. J. H. Fenton and M. Gostling. The authors, having previously shown that bromomethylfurfuraldehyde results from the action of hydrogen bromide on lævulose, sorbose, inulin or cane sugar, now show that all forms of cellulose give large yields of the same bromomethylfurfuraldehyde under similar conditions; since the formation of this substance is characteristic of ketohexoses or of substances which give rise to them by hydrolysis, it seems conclusively proved that cellulose contains a nucleus similar to that of lævulose.—The ketonic constitution of cellulose, by C. F. Cross and E. J. Bevan. The authors contribute a statement of the evidence, other than that contained in the previous paper, in favour of the supposition that lævulose or some other ketose is the raw material used in the plant for the elaboration of cellulose.—Note on a method for comparing the affinity values of acids, by H. J. H. Fenton and H., O. Jones. The authors have shown that oxalacetic phenylhydrazone is decomposed on heating with water, giving carbon dioxide and pyruvic hydrazone, whilst on heating with acids, pyrazolone carboxylic acid and water are produced in accordance with the following equations:—



$$\begin{array}{l} CH_2.CO_2H \\ \quad| \\ C:N_2HPh \\ \quad| \\ CO_2H \end{array} = \begin{array}{l} CH_3 \\ \quad| \\ C:N_2HPh + CO_2. \\ \quad| \\ CO_2H. \end{array}$$



It is shown that, on heating with acids, the volumes of carbon dioxide evolved are in the inverse order of the affinity values of the acids used, other conditions remaining the same.—Organic derivatives of phosphoryl chloride and the space configuration of the valencies of phosphorus, by R. M. Caven. The author has prepared substituted phosphoryl chlorides of the form  in which the groups R_1, R_2 and R_3 are ethoxyl and the anilido- and paratoluido-residues respectively; the same substance is obtained irrespective of the order in which the substituting groups are put into the molecule, and the author therefore concludes that these three groups are similarly situated with respect to the rest of the molecule.—α-Hydroxycamphorcarboxylic acid, by A. Lapworth and E. M. Chapman. A method for the preparation of camphorquinone in quantity is given, and it is shown that this substance reacts with hydrogen cyanide to form a mixture of stereoisomeric α-hydroxycyanocamphors, ; this substance behaves as an α-hydroxynitrile, and may be hydrolysed to α-hydroxycamphorcarboxylic acid, .—The bacterial decomposition of formic acid, by W. C. C. Pakes and W. H. Jollyman. The authors show that certain bacteria decompose formic acid as sodium formate into equal volumes of carbon dioxide and hydrogen.—Preparation of substituted amides from the corresponding sodamide, by A. W. Titherley.—Note on two molecular compounds of acetamide, by A. W. Titherley.—Diacetamide: a new method of preparation, by A. W. Titherley. Diacetamide may be directly prepared by the action of acetyl chloride on acetamide.—Organic derivatives of silicon, by F. S. Kipping and L. L. Lloyd. Silicon tetrachloride, when treated with one molecular proportion of an alchohol, exchanges one chlorine atom for an alkyloxy-group yielding a substance of the composition $SiCl_3.OR$. The latter, by similar treatment with two other alcohols, can be converted ultimately into a substance of the constitution $SiCl(OR_1)(OR_2).OR_3$.—Isomeric hydrindamine camphor-π-sulphonates. Racemisation of α-bromocamphor, by F. S. Kipping. From the examination of the *dl*-hydrindamine *d*-camphor-π-sulphonate, it is concluded that slight racemisation occurs during the sulphonation of *d*α-bromocamphor.—Tetramethylene carbinol, by W. H. Perkin, jun. Tetramethylenecarboxylic chloride is reduced by sodium and moist ether to tetramethylene carbinol, a colourless oil boiling at 143-144°.

Zoological Society, February 5.—Mr. Howard Saunders, vice-president, in the chair.—Mr. Sclater called attention to the fine specimen of Prjevalsky's Horse (*Equus prjevalskii*) now mounted and exhibited in the gallery of the Muséum d'Histoire Naturelle of Paris, and made some remarks on its structure and peculiarities.—Mr. Oldfield Thomas gave an account of the mammals which Mr. R. I. Pocock and he had collected during a trip to the Balearic Islands in the spring of 1899. Twenty-four species were enumerated and remarked upon, amongst which was a new form of hedgehog, described as *Erinaceus algirus vagans*.—Dr. W. G. Ridewood read a paper on the horny excrescence on the snout of the southern right whale (*Balaena australis*), known to whalers as the "bonnet," in which he showed that the minute structure is the same in essential features as that of the *stratum corneum* of the normal skin of the whale. The cuticular fibres were set at right angles to the surface, and were not sharply differentiated or readily separable. Comparisons were drawn by the author between the structure of this horny excrescence and that of the nasal horn of the rhinoceros, the hoof of the horse, the horn of the ox and the baleen of the whale.—Mr. G. A. Boulenger, F.R.S., enumerated the species of batrachians and reptiles represented in a collection made by Dr. Donaldson Smith in Somaliland in 1899. Of the reptiles two were new to science and were described under the names *Hemidactylus laevis* and *H. barodanus*.—Mr. Sclater made some additional remarks on the two pieces of zebra-skin, exhibited at a previous meeting, which had been sent to him by Sir H. H. Johnston, K.C.B., from the Semleki Forest on the borders of the Uganda Protectorate, and expressed his opinion that they belonged to a hitherto unknown species, for which he proposed the provisional name of *Equus johnstoni*.—Mr. J. L. Bonhote read a paper on a second collection of Siamese mammals made by Mr. Th. H. Lyle, consul at Nau, Siam. The collection, although small, was of considerable interest, the twenty specimens composing it being referable to eleven species, one of which, *Sciurus macclellandi kongensis*, was described as new. Mr. Bonhote also communicated a paper containing an enumeration of the 139 species of birds of which specimens had been collected during the "Skeat Expedition" to the Malay Peninsula in 1899-1900.—Mr. F. E. Beddard, F.R.S., described a new species of freshwater annelid, under the name of *Bothrioneuron iris*, from specimens obtained in the Malay Peninsula during the "Skeat Expedition" in 1899-1900.

Entomological Society, February 6.—The Rev. Canon Fowler, president, in the chair.—The president exhibited a specimen of *Colias edusa* var. *helice*, with the margins of the wings entirely dark, as in the male; also a variety of *Carterocephalus palaemon*, with the hind wings dark save for one conspicuous orange spot.—Dr. T. A. Chapman exhibited a large series of Endrosæ, collected during the last few years by himself, Mr. A. H. Jones, and especially by Mr. Tutt, showing the relative approximation of the several species. Except *irrorella* from England, Finmark, and the Tyrol, and a few *aurita* from the Tyrol, all were from the Western Alps of Switzerland, Italy and France. Examples from each locality, he said, when sufficiently numerous usually have a special facies. Some, as all those from Arolla, radiate; those from Bourg St. Maurice are without radiate forms, and so on. Some are more yellow; others deeper orange; some more mixed. Elevation tends to produce radiation, but no other general conclusion as to the effect of height, latitude or longitude seems fully justified by the specimens.—Mr. G. C. Barrett exhibited for Mr. G. O. Day, of Knutsford, a black variety of *Aplecta nebulosa*, Tr., with white cilia, and an asymmetrical ♀ var. of *Fidonia atomaria*, Linn.—Mr. M. Jacoby exhibited an unknown specimen of the family Halticidæ.—Mrs. Nicholl exhibited a collection of Rhopalocera from the Lebanon district of Syria, and Mr. H. J. Elwes, on her behalf, read a paper explaining and illustrating the several species included. Among other species Mr. Elwes drew especial attention to *Thecla myrtale*, which, since it was described by Klug in 1832, has remained one of the least known members of the palæarctic fauna. No specimens, it appears, had been taken in the interval until Mrs. Nicholl found it on the high mountains not uncommonly in May and June.—The following papers were communicated:—A revision of the genus Astathes, Newm., and allied genera of Longicorn Coleoptera, by C. J. Gahan, M.A., and a preliminary catalogue of the Lepidoptera-Heterocera of Trinidad, by W. J. Kaye.

Linnean Society, February 7.—Prof. S. H. Vines, F.R.S., president, in the chair.—Mr. H. W. Monckton exhibited some lantern-slides showing a large ammonite in the Kimmeridge clay at Swanage, and several views taken at the Pentland oyster-bed at Tilly Whim, and the Purbeck oyster-bed in Durleston Bay.—The president, whilst demonstrating the property possessed by certain vegetable liquids, such as coconut milk and the juice of the pineapple and the potato, to cause the oxidation of guaiacum tincture in the presence of hydrogen peroxide, a blue colour being produced, drew attention to the recent researches of Raciborski on the subject. Raciborski has made the interesting discovery that certain tissues of the plant-body, more particularly the sieve-tubes and the laticiferous tissue, contain some substance, to which he gives the name *leptomin*, which likewise causes guaiacum to turn blue in the presence of hydrogen peroxide, and has gone on to infer that this leptomin may be regarded as discharging in the plant a function analogous to that of hæmoglobin in the animal body. The president urged, against this assumption, that although both leptomin and hæmoglobin give the guaiacum reaction, yet this fact does not prove that leptomin can combine with oxygen, and can act as an oxygen-carrier in the organism, in the manner which is so characteristic of hæmoglobin; and that, therefore, the suggested analogy between the two substances is at least premature.—Mr. H. M. Bernard read a paper, of which an abstract had been previously circulated, on the necessity for a provisional nomenclature for those forms of life which cannot be at once arranged in a natural system. A discussion followed in which Prof. Ray Lankester, Sir W. T. Thiselton-Dyer, Mr. Bateson, Mr. Elwes, and Prof. Jeffery Bell took part. It was proposed by Prof. Lankester, and seconded by Mr. H. J. Elwes, that the discussion be adjourned to another meeting, and that resolutions be framed for submission to that meeting when called.

Anthropological Institute, February 12.—Prof. Haddon, F.R.S., in the chair.—Mr. A. L. Lewis, treasurer of the Institute, showed slides illustrative of the recent damage to Stonehenge.—A paper was read on Malay metal-work, by Mr. Walter Rosenhain. The paper dealt with some specimens of Malay metal-work submitted to the author for microscopic and other examination by Mr. W. W. Skeat.—Some Malay processes actually witnessed by Mr. Skeat were described, and the bearings of the microscopic examination on the explanations of these processes were discussed. The first question dealt with was the production of the "damask" pattern on a Malay kris. Microphotographs were given showing that the "damask iron" really consists of layers of loosely-welded wrought iron, the only other metal used being tool steel. The body of the blade is made of steel and a layer of laminated "damask iron" is welded upon either side of the central layer of steel; a thin layer of steel is welded on outside the "damask iron." The author believes that the striated "damask" effect is due to the opening of the loose welds in the damask iron during the forging of the blade, steel being driven between the laminæ. The outside layer of steel is entirely ground away, and when the compound surface so produced is "etched" by the pickling process employed, the more readily corroded steel is attacked, leaving the edges of the layers of iron as a series of narrow projected ridges.—The final section of the paper dealt with the Malay method of producing chains by casting, and was illustrated by some successful experiments.

Mathematical Society, February 14.—Dr. Hobson, F.R.S., president, in the chair.—Dr. Larmor, F.R.S., gave an abstract of a paper by Mr. T. Stuart, entitled "The Distribution of Velocity and the Equations of the Stream Lines, due to the Motion of an Ellipsoid in Fluid Frictionless and Viscous."—Lieut.-Colonel Cunningham communicated a paper on factorisable twin binomials. Mr. C. E. Bickmore spoke on the subject.—Mr. Tucker gave an account of the brocardal properties of some associated triangles.—The following papers were communicated by the president: Concerning the Abelian and related linear groups, by Dr. L. E. Dickson.—A geometrical theory of differential equations of the first and second order, by Mr. R. W. Hudson.—A note on stability, with a hydrodynamical application, by Mr. Bromwich.—Remarks on notation in Lie's theory of groups, and on Schur's determination of a continuous group of given structure, with remarks on Mr. Campbell's paper (read at the January meeting), by Mr. H. F. Baker, F.R.S.; and a note on curves similar and parallel to one another, by Mr. D. B. Mair.

CAMBRIDGE.

Philosophical Society, February 4.—Prof. Macalister, president, in the chair.—Geometrical notes, by the Master of St. John's College. These notes give simple proofs of Halley's construction for the normal or normals from a given point to a parabola, and Frégier's theorem that a chord of a conic which subtends a right angle at a fixed point of the curve passes through a fixed point on the normal thereat.—On the interference bands produced by a thin wedge, by Mr. H. C. Pocklington. The interference bands produced when monochromatic light from a small but finite source falls obliquely on a thin wedge of slightly reflecting material are investigated. It is shown that if the incident light is a parallel beam, the bands do not lie in the wedge, but in the air in a plane passing through the edge of the wedge and perpendicular to the reflected light, and that the distance between consecutive bands is $\lambda/2\alpha$.—On some rare and interesting fungi, collected during the past year, by Prof. Marshall Ward.—On geotropism, by Mr. F. Darwin. The experiments described were directed to the question whether or not the tip of the root is the region where the gravitation stimulus is perceived. The germinating seeds were so placed that the tip of the root was fixed in the horizontal position, while the base of the root together with the seed could move. Since the supposed sensitive region remains horizontal, it was expected that the motor region of the root would continue to curve in response to the continued stimulation of the tip. This was found to be the case. But the great technical difficulties of the method and certain difficulties of interpretation render the evidence less striking than might have been hoped.—Notes on artificial cultures of Xylaria, by Miss E. Dale (communicated by Prof. Marshall Ward). Two species were cultivated from ascospores and grew equally well on pieces of the sterilised wood of beech, oak and silver fir, on which they produced several types of conidiophores.—The mycelium penetrates into all the tissues of the wood which forms its substratum, passing from cell to cell through the pits. Its action on the wood fibres is peculiar. Straight hyphæ pass down the lumen and give off branches which penetrate the pits and grow spirally, each lying in a channel which it has made in the cell-wall, apparently by excreting some wood-destroying enzyme.—The habits and development of some West African fishes, by Mr. J. S. Budgett. The paper gave an account of a part of the material obtained during a recent visit to the Island of McCarthy on the Gambia river, in order to investigate the development of *Polypterus*. The young larva of *Polypterus lapradii*, Steind., was described which had not yet developed the bony scales on the body. The nests and larvæ of *Protopterus annectens*, Ow., were described and the development shown to be remarkably similar to that of *Lepidosiren*. The floating nests and the development of *Gymnarchus niloticus*, Cuv., were described and also the very large nests and the larvæ of *Heterotis niloticus*, Cuv. The larvæ of both these forms possess externally produced gill-filaments, while the development of *Gymnarchus* is in some respects shark-like. Two other forms, *Sarcodaces odoë*, Bl., and *Hyperopisus bebe*, Lacep., were shown to possess in the larval condition well-developed cement organs on the front of the head.—On a new form of microtome, by Mr. H. M. Leake (communicated by Mr. A. E. Shipley.)—The ignoration of coordinates, by Mr. T. J. I'A. Bromwich.—A theorem on curves belonging to a linear complex, by Mr. J. H. Grace.

Dublin.

Royal Dublin Society, December 19, 1900.—Prof. W. N. Hartley, F.R.S., in the chair.—Prof. E. A. Letts and Mr. R. F. Blake read a paper (communicated by Dr. W. E. Adeney) on a simple and accurate method of estimating the dissolved oxygen in fresh water, sea water and sewage effluents.—Mr. E. St. John Lyburn read a paper (communicated by Prof. W. N. Hartley) on prospecting for gold in the county of Wicklow, with an examination of Irish rocks for gold and silver. The author deals with the history of the discovery of gold in Ireland, and more especially with the results of a six months' prospecting tour in the county of Wicklow. One hundred and ten samples were taken and subjected to assay, the highest assay giving 4 dwts. pure gold per ton (2240 lbs.); this sample was obtained from a quartz vein, about eight inches wide, on the Croghan Kinshelagh mountain, and in the immediate vicinity of the Government workings of 1798. The author expressed the view that the locality he explored was worthy of further attention.

January 16, 1901.—Dr. W. E. Adeney in the chair.—Prof. Hugh Ryan read a paper on the preparation of amidoketones; and Prof. E. A. Letts and Mr. R. F. Blake communicated a paper on some problems connected with atmospheric carbonic acid, and on a new and accurate method of determining its amount, suitable for scientific expeditions.

Paris.

Academy of Sciences, February 18.—M. Fouqué in the chair.—On a new form of the equations of mechanics, by M. H. Poincaré.—On the secondary radio-activity of metals, by M. Henri Becquerel. Metals receiving the direct rays from a radio-active substance appear to give off a secondary radiation. The penetrating power of this secondary radiation is more feeble than that of the primary rays, and is analogous to the same property of the secondary Röntgen rays discovered by M. Sagnac. The effect of this is that a metallic plate, placed upon a photographic plate, instead of acting as a screen to arrest the radiation from the source, gives, on the contrary, a stronger impression.—On a new gaseous compound, sulphuryl fluoride, SO_2F_2, by MM. Moissan and P. Lebeau (see p. 426).—On the alkyl cyanomalonic esters and the alkylcyanacetic acids derived from them, by MM. A. Haller and G. Blanc. It is shown that cyanomalonic ester contains the group CH, and that the substitution of alkyl radicles takes place on this atom of hydrogen, since in all the derivatives obtained from it the radicles are united to the carbon atom of the group CH.—Note on a congenital lacrymopharyngo-facial fistula, open below the left nostril, by M. Lannelongue. A description of a congenital fistula representing, in the form of an anomaly, a transition state in development. The case has an important bearing upon the theory of the development of the human embryo, and would appear to be in direct contradiction to the views of Albrecht on the development of the nose and upper lip. The operation described effected a complete cure.—On the discovery of a sea urchin of the Cretacean age in the eastern Sahara, by M. de Lapparent. The fossil described, which was found accidentally by Colonel Monteil at Zau Saghair, near Bilma, has been recognised by M. Victor Gautier as belonging to the same genus as an echinoderm discovered in the upper layers of the Cretacean in Baluchistan. It is thus proved that towards the end of the Cretacean epoch, about the time when in Europe the sea underwent such a marked retrogression, not only did it persist in the Lybian Desert, but it advanced to the neighbourhood of Tchad, manifesting by its fauna affinities with the Indian region.—On the propagation of waves in viscous fluids, by M. P. Duhem.—Observations on the variability of the planet 433 Eros, made at the Observatory of Toulouse with the 23-cm. Brunner equatorial, by M. F. Rossard.—On the luminous variability of Eros, by M. Ch. Andre (see p. 426). From the photometric observations, it is concluded that the planet is formed of a double system of two asteroids, of which the diameters are very nearly in the ratio of three to two, and whose orbital plane passes through the earth.—On the déformation of the paraboloid, by M. C. Guichard.—On the problem of the isoperimeters, by M. A. Hurwitz.—On functions of two variables analogous to modular functions, by M. R. Alexais.—On a new micrometer eye-piece, by M. L. Malassez.—On the specific absorption of the X-rays by metallic salts, by MM. Alexandre Hebert and Georges Reynaud. Results are given for experiments on the relative specific absorption of a series of metallic nitrates, from which it is shown that, in general, the absorption of the X-rays by the nitrates becomes greater with the increase in the atomic weight of the combined metal. The curve for the specific absorption plotted against the atomic weights as abscissæ is practically an equilateral hyperbola.—On hydrocinchonine, by MM. E. Jungfleisch and E. Leger. The substance previously obtained by the authors by the action of dilute sulphuric acid upon cinchonine and described by them as cinchonifine, is now shown to be identical with the hydrocinchonine of Caventou and Willm.—On diphenylcarbodiazine, by M. P. Cazeneuve.—On a new alcohol derived from limonene, by M. P. Cazeneuve. The new alcohol, named limoneol, is prepared by the action of peroxide of nitrogen upon limonene. It is a secondary alcohol, like pinenol, and gives a ketone on oxidation with chromic acid mixture.—The transformation of dimethylacrylic acid into dimethylpyruvic acid, by MM. Bouveault and A. Wahl. If the aminodimethylacrylate of ethyl, the preparation of which is described in a previous paper, is heated with aqueous hydrochloric acid, ethyl dimethylpyruvate is produced, the oxime and semicarbazone of which were prepared for the purpose of identification.—Action of the monohalogen acids of the fatty series upon pyridine and quinoline, by MM. L. J. Simon and L. Dubreuil.—On the pyrogallolsulphonic acids, by M. Marcel Delage.—The reserve hydrocarbon in the tubercles of *Arrhenathererum bulbosum*, by M. V. Harlay. The tubercles on extraction with dilute alcohol yield 4·8 per cent. of a carbohydrate, which on hydrolysis with dilute sulphuric acid gives pure lævulose. The original substance differs from inulin in solubility and rotatory power.—Nervous transmission of an instantaneous electric stimulus, by M. Aug. Charpentier. From the researches described it follows that an electrical stimulus may give rise to a double transmission on the part of the nerve, one part being transmitted nearly instantaneously, like an ordinary conductor, with a velocity too great to be measured in the usual way, the other part of the stimulus is transmitted, always electrically, with the very moderate velocity of about 20 to 30 metres per second.—The physiological action of wine, by M. L. Roos. From experiments on guinea-pigs the author concludes that the daily use of wine with the food, even in relatively large proportions, exerts no unfavourable effect.—The luminescence obtained with certain organic compounds, by M. Raphael Dubois. In presence of alcoholic potash a considerable number of organic substances become luminescent. The reaction may be of some service in the qualitative analysis of certain essential oils.—The nucleated red blood corpuscle behaves like a vegetable cell, from the point of view of osmosis, towards urea in solution, by M. R. Quinton.—On the absorption of monocalcium phosphate by arable earth and humus, by M. J. Dumont.—Observations relating to the propagation in apple orchards of *Nectria ditissima*, by M. Descours-Desacres. Nicotine, tannin and tannic acid have proved to be the most efficacious remedies against this disease.—On the petrographical province of the north-east of Madagascar, by M. A. Lacroix.—On a mass of metallic iron which was said to have fallen from the sky in the Soudan on June 15, 1900, by M. Stanislas Meunier.—Concerning the mineral layers of oolitic iron of Lorraine and their mode of formation, by M. Georges Rolland.

St. Louis.

Academy of Science, January 21.—Rev. M. S. Brennan read a short sketch of the progress of astronomy in the United States, in which the material equipment and the discoveries made during the past century were passed in review.—A paper by Prof. T. G. Poats, entitled "Isogonic Projection," was presented in abstract.—Prof. F. E. Nipher showed, by means of the lantern, a series of negatives printed by contact from a lantern slide or positive picture by the light of a 300-candle incandescent lamp. The unit of exposure adopted was one lamp-metre-second. The exposures varied from 0·0054 to 4800. All were developed in the dark-room with hydrochinon, those above 0·1 exposure having in the bath one drop of saturated hypo to the ounce of bath. The plate having an exposure of 0·1 seemed to be normally exposed. An exposure 210 gave a negative showing some fogging, but a print from it by ordinary methods gave a very satisfactory result. With longer exposures, the plate began to reverse, locally. With an exposure of 3600, which was an exposure of one hour at a distance of one metre from a 300-candle lamp, half of the plate still showed as a negative. The shadow on the gown of a figure in the landscape showed white as a negative, and the part of the gown in sunshine showed white as a positive. The penumbra between light and shadow was darker. All the details were sharp, but lights and shadows were somewhat incongruous. With an exposure of 4800 the details had not yet all reversed, but the greater part of the plate had become a positive. The greatest exposure giving a negative which would yield an acceptable print was 210, which was 39,000 times the least exposure which would give a good negative. All exposures of 210 and over gave complete positives when the plates were developed 1·41 meter from a 16-candle lamp, or in stronger light. As good a picture as has been obtained had an exposure of 4800, and was developed within half a meter of a 300-candle lamp. A fair picture had even been obtained from a two-hour exposure to direct sunlight with a Cramer "Crown" plate. It was stated that hypo in the developing bath did not affect the zero condition, or change the character as to positive and negative. When no hypo is used, the plate fogs so quickly that the picture is invisible before it has time to fully develop. After fixing, the thin shadowy picture showing on the fogged plate has the same local positive and negative characters that are shown on the clearly defined picture of the same exposure when developed in the hypo-hydrochinon bath. The greatest exposures giving good results that have been measured with reasonable accuracy were about 900,000 times as great as the least exposure giving a good negative in the dark-room. This factor can certainly be trebled. A plate having any intermediate exposure can be developed either as a good positive in the light or as a good negative in the dark-room.

DIARY OF SOCIETIES.

THURSDAY, February 28.

Royal Society, at 4.30.—On the Structure and Affinities of Fossil Plants from the Palæozoic Rocks. IV. The Seed-like Fructification of *Lepidocarpon*, a Genus of Lycopodiaceous Cones from the Carboniferous Formation: Dr. D. H. Scott, F.R.S.—A Preliminary Account of the Development of the Free-swimming Nauplius of *Leptodon hyalina*, Lillj.: Dr. E. Warren.—On the Result of Chilling Copper-Tin Alloys: C. T. Heycock, F.R.S., and F. H. Neville, F.R.S.—On the Theory of Consistence of Logical Class-frequencies, and its Geometrical Representation: G. Udny Yule.

Society of Arts, at 4.30.—Railways and Famine: Horace Bell.

Institution of Electrical Engineers, at 8.—Conclusion of discussion on Mr. Madgen's paper.—Followed, if possible, by Cables: M. O'Gorman.

FRIDAY, March 1.

Royal Institution, at 9.—Enamels: H. H. Cunynghame.

Geologists' Association, at 8.—The Post-Pliocene Non-Marine Mollusca of the South of England: A. S. Kennard and B. B. Woodward.—The Pleistocene Fauna of West Wittering, Sussex: J. P. Johnson.

SATURDAY, March 2.

Royal Institution, at 3.—Sound and Vibrations: Lord Rayleigh, F.R.S.

MONDAY, March 4.

Society of Arts, at 8.—The Bearings of Geometry on the Chemistry of Fermentation: W. J. Pope.

Victoria Institute, at 4.30.—A Visit to the Hittite Cities, Eyuk and Boghas: Rev. G. E. White.

TUESDAY, March 5.

Royal Institution, at 3.—The Cell as the Unit of Life: Dr. Allan Macfadyen.

Zoological Society, at 8.30.—On some Extinct Reptiles from Patagonia, of the Genera *Mioaunia*, *Dinilysia*, and *Genyodectes*: Dr. A. Smith Woodward.—Note on the Innervation of the Supra-orbital Canal in *Chimaera monstrosa*: R. H. Burne.—Contributions to the Knowledge of the Structure and Systematic Arrangement of Earthworms: F. E. Beddard, F.R.S.

Institution of Civil Engineers, at 8.—Discussion of paper on the Rotatory Process of Cement Manufacture: W. H. Stanger and Bertram Blount.—Ballot for Members.

WEDNESDAY, March 6.

Society of Arts, at 8.—Modern Artillery: Lieut. Arthur Trevor Dawson.

Geological Society, at 8.—Recent Geological Changes in Central and Northern Asia: G. F. Wright.—The Hollow Spherulites of the Yellowstone and Great Britain: J. Parkinson.

Society of Public Analysts, at 8.—The Determination of Dissolved Oxygen in Water in Presence of Nitrites and Organic Matter: Dr. S. Rideal.—Some Analyses of Oatmeal: Dr. Bernard Dyer.—The Detection and Estimation of Preservatives in Milk: M. Wynter Blyth.

THURSDAY, March 7.

Royal Society, at 4.30.

Linnean Society, at 8.—A Contribution to the Fresh-water Algæ of Ceylon: Messrs. W. West and G. S. West.—On Mediterranean Malacostraca: A. A. Walker.

Institution of Electrical Engineers, at 8.—Insulation on Cables: M. O'Gorman.

Chemical Society, at 8.—(1) Nomenclature of the Acid Esters of Unsymmetrical Dibasic Acids; (2) Additive Compounds of α- and β-Naphthylamine with Trinitrobenzene Derivatives; (3) Acetylation of Arylamines: J. J. Sudborough.—Formation of Amides from Aldehydes: R. H. Pickard and W. Carter.

Röntgen Society, at 8.—Exhibition of Skiagrams and Apparatus.

FRIDAY, March 8.

Royal Institution, at 9.—Vitrified Quartz: W. A. Shenstone, F.R.S.

Royal Astronomical Society, at 5.

Institution of Civil Engineers, at 8.—Sewage Treatment: C. Johnston.

SATURDAY, March 9.

Royal Institution, at 3.—Sound and Vibrations: Lord Rayleigh, F.R.S.

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